Idaho National Engineering & Environmental Laboratory
Bechtel BWXT Idaho LLC.

PORTABLE FIELD SAMPLING GLOVEBAG SYSTEM

Summary:
A portable glove bag has been developed to collect environmental samples from probes driven into transuranic contaminated waste in the SDA at the INEEL. The glove bag is rectangular in shape, with a 36" X 48" flat bottom base set on a metal platform. The sides are 24" high and provide containment while collecting vapor and water samples. The frame is made up from nylon flex rods and PVC pipe. It is made from yellow nylon reinforced PVC sheathing. The seams are sealed using heat or sewn and glued. The glove bag has 3 sets of yellow translucent PVC gloves. The glove bag is visually inspected for defects and appropriate repairs are made if needed. The glove bag has a transfer port and uses a HEPA vacuum and filter to maintain a negative pressure. These glove bags are portable which makes these more useful for a probing operation. The expected useful life of a glove bag is less than 5 years.

The equipment used to collect water and vapor samples from the Lysimeter and Vapor Port probes will be operated inside the glove bags to ensure there will be no releases to the environment and protect the personnel taking the samples.

The cost to construct this system is approximately $2,600 versus $5000 for the alternative design. There is a need to construct 6 units instead of 18 since this design is portable. A cost avoidance of $74,400 is available by not having to construct the extra units.

This deployment helps to satisfy STCG needs 6.1.01 (In-Situ Debris Characterization for Partial Retrieval), 6.1.02 (Real Time Field Instrumentation for Characterization and Monitoring Soils and Groundwater) and 6.1.27 (Integrated Suite of In Situ Instruments to Determine Flux in the Vadose Zone).

Qualitative Benefit Analysis		
Programmatic Risk	◒	The OU 7-13/14 RI/FS noted a lack of leachate data below the SDA waste. Glove bags are specifically designed to contain the equipment needed to collect the vapor and water samples. This information may allow the FS managers to avoid having to recommend the most conservative remedy.
Technical Adequacy	◒	The glove bags were custom-made for the SDA probing project to support the unique probe sampling equipment.

Safety	●	The glove bags ensure there will be no releases to the environment and will protect the personnel taking the samples. An Engineering Design File was completed for the glove bags and was reviewed and approved by the project safety engineer.
Schedule Impact	◒	The bags were developed to support WAG-7 probe sampling. The lightweight portable design allows the field team to move the glove bag, eliminating delays waiting for labor and vehicles that were required to transport the heavier designs.

●	◒	○	◓	◉
Major Improvement	Some Improvement	No Change	Somewhat Worse	Major Decline

Quantitative Benefit Analysis		
Cost Impact Analysis	The cost to construct this system is approximately $2,600 versus $5000 for the alternative design. There is a need to construct only 6 units instead of 18 since this design is portable. A cost avoidance of $74,400 is available by not having to construct the extra units.	
	Annual Savings	$14,880
	Life Cycle Cost Savings	$74,400
	Return-On-Investment (ROI)	95%

Worksheet 1: Operating & Maintenance Annual Recurring Costs

Expense Cost Items *	Before (B) Annual Costs	After (A) Annual Costs
1. Equipment	$ 18,000.00	$ -
2. Purchased Raw Materials and Supplies	$ -	$ -
3. Process Operation Costs:		
Utility Costs	$ -	$ -
Labor Costs	$ -	$ -
Routine Maintenance Costs for Processes	$ -	$ -
Subtotal	$ -	$ -
4. PPE and Related Health/Safety/Supply Costs	$ -	$ -
5. Waste Management Costs:		
Waste Container Costs	$ -	$ -
Treatment/Storage/Disposal Costs	$ -	$ -
Inspection/Compliance Costs	$ -	$ -
Subtotal	$ -	$ -
6. Recycling Costs		
Material Collection/Separation/Preparation Costs:		
a) Material and Supply Costs	$ -	$ -
b) Operations and Maintenance Labor Costs	$ -	$ -
Vendor Costs for Recycling	$ -	$ -
Subtotal	$ -	$ -
7. Administrative/other Costs	$ -	$ -
Total Annual Cost:	$ 18,000.00	$ -

* See attached Supporting Data and Calculations.

1 Equipment
B. The alternative design has a cost of $3,000 for the glove box, with an additional $2,000 for the internal sampling system. There would have been a need to construct 18 of these units. This would have cost the project $90,000. Divide this by 5 years of life and this is $18,000 per year. The new design has construction costs of $600 plus $2,000 for sampling system, but since the unit is portable there is only a need to build 6 units. The total construction costs will be $15,600. Divide this by 5 years and the cost is $3,120 per year. The cost savings here would be $74,400 over 5 years.

Worksheet 2: Itemized Project Funding Requirements*
(i.e., One Time Implementation Costs)

Category	Cost $
INITIAL CAPITAL INVESTMENT	
1. Design	$ -
2. Purchase	$ 15,600
3. Installation	$ -
4. Other Capital Investment (explain)	$ -
Subtotal: Capital Investment= (C)	$ 15,600
INSTALLATION OPERATING EXPENSES	
1. Planning/Procedure Development	$ -
2. Training	$ -
3. Miscellaneous Supplies	$ -
4. Startup/testing	$ -
5. Readiness Reviews/Management Assessment/Administrative Costs	$ -
6. Other Installation Operating Expenses (explain)	$ -
Subtotal: Installation Operating Expense = (E)	$ -
7. All company adders (G & A/PHMC Fee, MPR, GFS, Overhead, taxes, etc.)(if not contained in above items)	$ -
Total Project Funding Requirements=(C + E)	$ 15,600
Useful Project Life = (L) 5 Years	Time to Implemen 0 Months
Estimated Project Termination/Disassembly Cost (if applicable) = (D)	$ -
(Only for Projects where L<5 years; D=0 if L>5 years)	

TOTAL LIFE-CYCLE COST SAVINGS CALCULATION FOR IPABS-IS

(Before - After) x (Useful Life) - (Total Project Funding Requirements + Termination)

Total Life Cycle Cost Savings Estimate = (B - A) x L - (C+E+D) $74,400

RETURN ON INVESTMENT CALCULATION

Return on Investment (ROI) % =

$$\frac{\textit{(Before - After) - [(Total Project Funding Requirements + Termination)/Useful Life]}}{\textit{[Total Project Funding Requirements + Project Termination]}} \times 100$$

$$ROI = \frac{(B-A)-[(C+E+D)/L}{(C+E+D)} \times 100 \quad 95 \ \%$$

O&M Annual Recurring Costs:				Project Funding Requirements:			
Annual Costs, Before=	$ 18,000	(B)		Capital Investment=	$ 15,600	(C)	
Annual Costs, After=	$ -	(A)		Installation Op. Exp=	$ -	(E)	
Net Annual Savings=	$ 18,000	(B-A)		Total Project Funds=	$ 15,600	(C+E)	

Note: Before (B) and After (A) are Operating & Maintenance Annual Recurring Costs from Worksheet 1.

* See attached Supporting Data and Calculations.

CURRENT METHOD	
Glove Bag (cost to construct)	- $ 600.00 ea.
Sampling Sys.(internal valving, tubing etc.)	- $2,000.00 ea.
Number Req.(required to be built)	-6
Life (expectancy)	- <5 years
	$15,600
ALTERNATE METHOD	
Est. Glove Box Cost	- $3,000.00 ea.
Sampling Sys.	- $2,000.00 ea.
Number Req.	-18
Life	- <5 years
	$90,000

SCIENCE AND TECHNOLOGY BENEFIT ANALYSIS DEPLOYMENT APPROVALS

Technology Deployed: PORTABLE FIELD SAMPLING GLOVEBAG SYSTEM

Date Deployed: 07/09/01

EM Program(s) Impacted: Environmental Restoration Program

Approval Signatures

Lee Lewke — 8/21/01

Contractor Program Manager — Date

N/A

Contractor Program Manager — Date

Kathleen E Hain — 8/23/01

DOE-ID Program Manager — Date

N/A

DOE-ID Program Manager — Date